

narrow (1 - 2 mm.) peripheral band of the same color, sometimes bordered above by a lavender line. As the colors fade, each year's markings become lighter so that in some old shells the whorls above the body whorl are almost white. A few specimens show on the body whorls some spiral bandings as in the form *floridanus*. Periostracal green lines seldom present and few in number. Growth-rest varices slightly expanded.

Type material: The type locality is a small hammock of the southern Everglades. The holotype is a four-year-old shell, length 59 mm., width 28 mm., aperture width 15.5 mm., distance from suture to base of shell 26 mm. The holotype has been placed in the collection of the United States National Museum, Washington, D.C. Paratypes have been placed in the United States National Museum, the Museum of Comparative Zoology, Harvard University, the Academy of Natural Sciences of Philadelphia, University of Florida, Gainesville, and the Everglades National Park Collection, Homestead, Florida.

Comments: The progenitors of *kennethi* first appeared in Pinecrest Hammock No. 13 into which Mr. Erwin C. Winte had comingled some introduced *Liguus* with the native population. Unfortunately, no records were kept and in-

formation as to the identity of the forms introduced is uncertain. Mr. Winte and I isolated five snails of this new form in a barren hammock. Later most of the progeny were transferred to another hammock. Since then, the two colonies have remained monomorphic. This phenomenon, plus the fact that *kennethi* shows no similarity to any of the forms of the original population leaves its genealogy uncertain. Its overall shape and appearance indicate only mainland forms were involved but its somewhat glossy appearance in five and six-year-old specimens suggests the influence of a Florida Keys ancestor.

I name this snail for my son whose help in the exploration for suitable hammocks, collecting *Liguus* material and establishing it in the Everglades National Park contributed substantially to the success of the Park *Liguus* Project.

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CHICOREUS COSMANI, A NEW MURICID GASTROPOD FROM THE WEST INDIES

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Despite the fact that the taxonomy of the family Muricidae has recently suffered under the hands of various conflicting interpretations (E. H. Vokes, 1971, Radwin and D'Attilio, 1976; Wagner and Abbott, 1978), new, apparently valid, taxa continue to come to light (Emerson and D'Attilio, 1979). Contributing to our knowledge of marine mollusks is a corps of enthusiastic SCUBA divers and ardent private shell collectors. An outstanding example are the collecting efforts of Mr. Dieter Cosman of Long Island, New York, who has personally collected and documented numer-

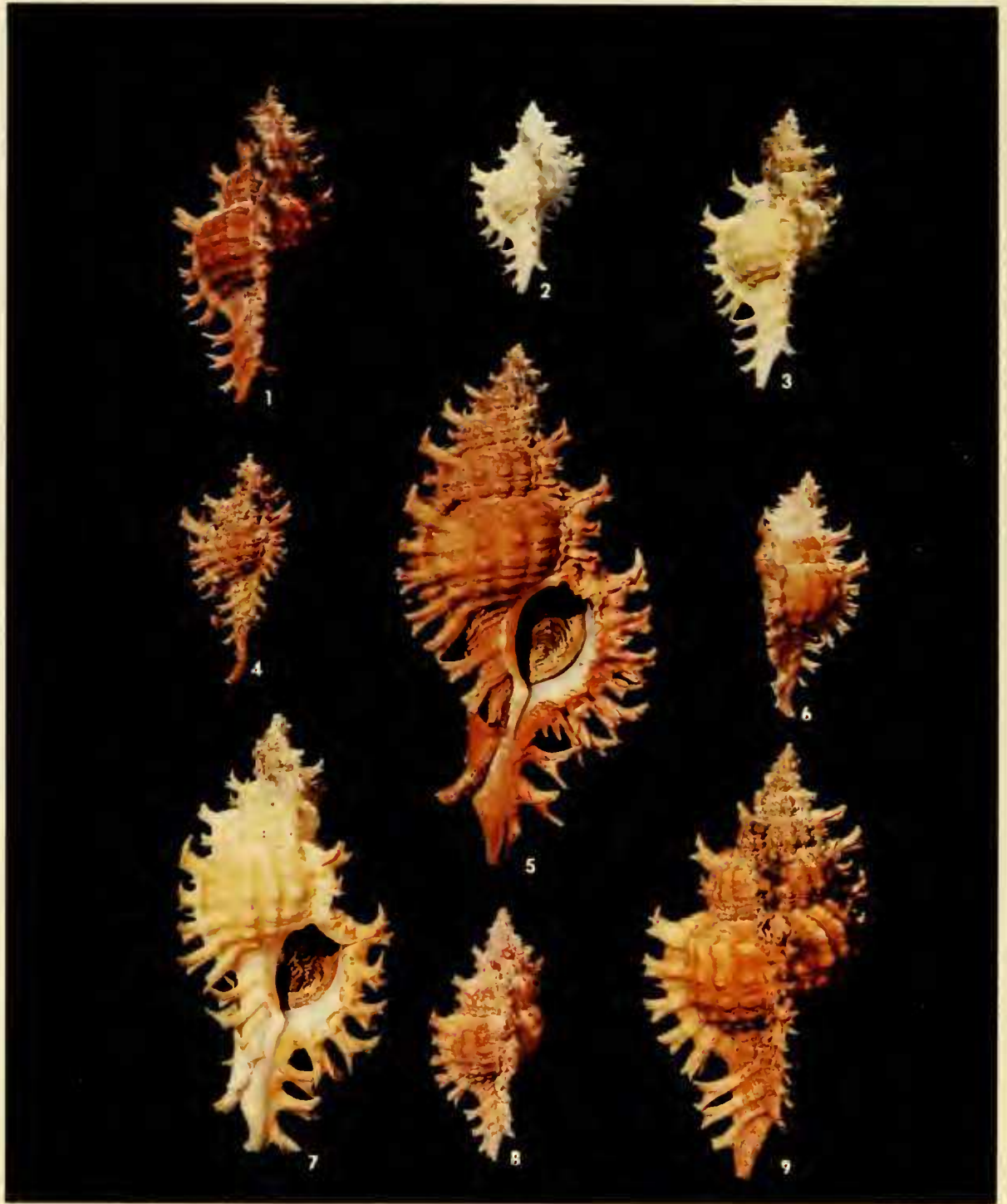
ous outstanding conchological discoveries in the tropical Western Hemisphere.

Among Mr. Cosman's unusual discoveries is a colony of *Chicoreus* muricid snails from Jamaica representing a species which evidently has not been given a valid, scientific name. We take great pleasure in naming this new species after him.

Chicoreus cosmani new species

(Figs. 1-9)

Description: Shell moderate in size for the genus, attaining a length of 79 mm., trigonally



FIGS. 1-9. *Chicoreus cosmani* Abbott and Finlay, new species. Ocho Rios, Jamaica. 5, in the center is the holotype, 79 mm. in length, the other figures are paratypes from the same locality. Collected by Dieter Cosman, March 1967.

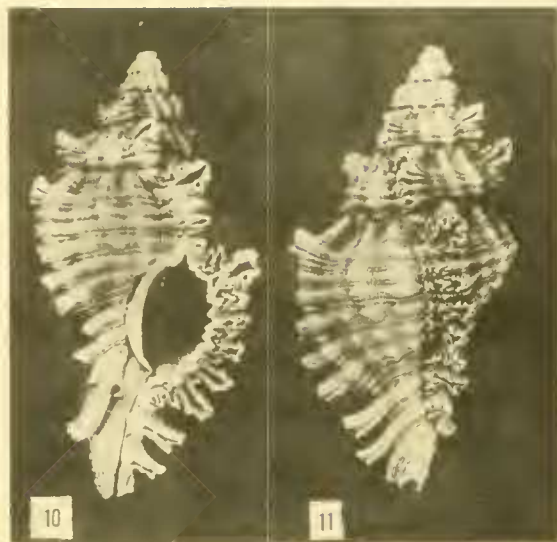
fusiform in shape. Spire acute, with an angle of 35° to 40°, and about 45 percent of the entire length of the shell. Nuclear whorls 1 1/2 glossy-smooth, convex, small but bulbous, whitish to tan, and with a well-indented suture, followed by 8 or 9 convex, well-sculptured, post-nuclear whorls. First few whorls with a cancellate sculpture between the varices. Suture finely impressed and slightly wavy. Aperture relatively small, about one-fourth the length of the entire shell, and with the peristome entire. Parietal wall glossy, slightly raised, and tinted with yellow, orange-brown or pinkish. Outer lip scalloped and bearing 10 to 12 minute, raised, white denticles. Siphonal canal moderately broad, nearly sealed, and slightly recurved dorsally and to the right at the distal end. Former siphonal canal half as large, tube-like, recurved to the left, and bearing on its surface a half-dozen axial, irregular, small cords. Last (and earlier) whorls with three varices, originating just behind the varix above it on the previous whorl. Each varix in the body whorl bears 8 short, bi- or tri-furcate, scaly, partially (or rarely entirely) closed fronds. Three of these fronds are on the right side of the siphonal canal. In the early whorls the top frond is usually twice the size of those below. Intervarical sculpture consists of 4, rarely 3, even-sized axial, low cords which are crossed by numerous finer, spiral cords, thus forming a pattern of low, rounded beads, or tiny knobs, all about the same size. Color of shell varies from a uniform brownish orange to a pale yellow orange, rarely white. Interior of aperture white, with an orange-stained columella. Operculum chitinous, light-brown, oval, unguiculate, with fine, scaly concentric growth lines.

Measurements (mm) —

length	width (with spines)	no. whorls	
79	40	10+	holotype, fig. 5.
67	33	9+	paratype, fig. 7.
38	21	7.5	paratype, fig. 6.
29	17	8.0	paratype, fig. 3.
25	15	7.0	paratype, fig. 2.

Type locality: on pilings at the Reynolds Bauxite dock, Ocho Rios, north side of Jamaica. 10 to 15 feet. March 1967. Dieter Cosman, collector.

Types: The holotype (Fig. 5) has been deposited in the U. S. National Museum no. 783323. Para-



FIGS. 10, 11. *Chicoreus* species from Curacao resembling *cosmani*. 29 mm. in length. Collected by Henk Bielderman, 1973. Constance Boone collection. Photos courtesy of Emily Vokes.

types are in the collection of Dieter Cosman, C. John Finlay, the Academy of Natural Sciences of Philadelphia, the Amer. Mus. Nat. Hist., Jerome Bijur, and the Delaware Museum of Natural History. Specimens have been reported as "very uncommon in about 35 feet at the Bogue Islands, Discovery Bay, Orange Bay and Bull Bay (south coast), Jamaica, in water as deep as 60 feet by Michael Humfrey (1975, p. 131, pl. 15, figs. 10, 10a). We have not seen these specimens. One paratype (Acad. Nat. Sci. Philadelphia no. 35419) worn in condition, was collected by Robert Swift in St. Thomas, Virgin Islands, in the 1860's.

Remarks: The *Chicoreus* complex in the Caribbean is complicated by the existence of a number of species, subspecies and local, isolated forms, so that the present status of our knowledge is still far from complete. We believe that *C. cosmani* is a valid species, closely related to *C. dilectus* (A. Adams, 1855), *brevifrons* (Lamarck, 1822), *spectrum* (Reeve, 1855) and *florifer* (Reeve, 1845). It differs markedly from those other species in having 3 or 4 axial rows of rounded beads between the varices, somewhat reminiscent of the sculpturing seen in *Bursa pileare* (Linnaeus). The other species usually have one large and one or two smaller knobs on the shoulder of the whorl. In *brevifrons* and *mergus* E. Vokes, 1974, the spire is much lower, the shell more quadrate, and

the upper spine on the varix much larger and longer than those below. Closest to *cosmani* is the specimen from Curacao illustrated and identified by Ruth Fair (1976, pl. 6, figs. 73, 73a) as *Chicoreus pudoricolor* (Reeve, 1845). This may be a darkly striped, less beaded form of *cosmani*. The type and only known specimen of *pudoricolor* was returned to Denmark by Reeve, and has not been subsequently relocated. The original illustration and description suggests a species more like *corrugatus* (Sowerby, 1841) or a young *spectrum*. We consider *pudoricolor* a *species inquirenda*. The Indo-Pacific counterpart of *cosmani* is *akritos* Radwin and D'Attilio, 1976, from northern Australia.

ACKNOWLEDGMENTS

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POPULATION DYNAMICS AND ZONATION IN THE PERIWINKLE SNAIL, *LITTORINA ANGULIFERA*, OF THE TAMPA BAY, FLORIDA, REGION

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ABSTRACT

Seasonal changes in population density and size class distribution reflect the seasonal nature of reproduction in Littorina angulifera in the Tampa Bay, Florida, area. The zonation pattern of adult snails and juveniles is described. Both extremely high tides and a Gymnodinium breve "Red Tide" bloom reduced the population density. The Gymnodinium bloom killed new recruits differentially and had a long-lasting effect on the population density. The data show that most new recruits reach spawning size 9 to 10 months after metamorphosis. Most adults do not survive to spawn after two years, as there is an approximate 70 percent yearly mortality.

INTRODUCTION

This is our second report dealing with *Littorina angulifera* (Lamarck) in the Tampa Bay

area. The first dealt with reproductive behavior and early development (Gallagher and Reid, 1974); this report characterizes the composition